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APPENDIX F BIOGRAPHIES OF PROJECT TEAM

F.1 EPRI Management

Robert P. Kassawara, PhD, is EPRI Senior Project Manager for the Structural Reliability and Integrity group at EPRI. He is responsible for the technical, financial, and administrative planning and management of EPRI's research and development for seismic engineering for commercial nuclear power plants. Projects include all aspects of the discipline from seismic hazard to equipment qualification. Before joining EPRI in 1985, Dr. Kassawara managed the engineering analysis section of the Plant Engineering Division of IMPELL in Melville, New York. In this position, he was responsible for performing structural engineering analyses predominantly for the nuclear power industry. Between 1970 and 1981, he managed and contributed to nuclear power plant design and analysis at Combustion Engineering in Windsor, Connecticut. He has a BS in civil engineering from the Polytechnic Institute of Brooklyn (1966), and an MS (1968) and PhD (1970) in civil engineering from the University of Illinois.

Jeffrey F. Hamel is Executive Director of the Power Delivery and Utilization Sector at EPRI. His current research activities focus on supporting deployment of advanced nuclear plants in the near term, while promoting areas of research to support long-term nuclear sustainability and growth. Specifically, Mr. Hamel oversees research on near-term deployment of advanced light-water-reactor nuclear plants, development of the Next Generation Nuclear Plant GEN IV technology, and technical and commercial support for an integrated spent-fuel management strategy. Before joining EPRI in 2007, he worked at General Electric as the manager of special projects, with responsibility for managing and leading new growth for GE's nuclear business, particularly in pressurized-water-reactor and spent-fuel services. In addition, while at GE, he supported the commercial development of new nuclear power plant projects both domestically and internationally, including development of key engineering, mechanical, and electrical equipment necessary for project execution. Mr. Hamel received a BS in marine transportation from the Massachusetts Maritime Academy in Buzzards Bay, Massachusetts, along with a U.S. Coast Guard Merchant Marine license and U.S. Navy Reserve commission. He received an MBA from Santa Clara University in Santa Clara, California.

F.2 Project Manager

Lawrence A. Salomone, PE, is the Project Manager for the EPRI (2004, 2006) Ground-Motion Model (GMM) Review Project. He is a registered Professional Engineer with 42 years of experience in the environmental and earth sciences. He was the Site Chief Geotechnical Engineer at the Savannah River Site (SRS) in Aiken, South Carolina, for 19 years, where he developed and managed a \$100 million geological, seismological, and geotechnical (GSG) characterization

program to integrate geotechnical and geo-environmental work for mission-critical nuclear facilities at the SRS. In 2011, he worked with vendors interested in obtaining design certification for various Small Modular Reactor (SMR) designs. He has directed 35-person and 70-person multidisciplinary groups. He directed the licensing, site preparation, and foundation operations for the Hope Creek Generation Station. He conducted research for the National Bureau of Standards (now National Institute of Standards and Technology) to advance geotechnical, earthquake engineering, and energy technology. Mr. Salomone was nominated by the National Capital Section of the American Society of Civil Engineers for the Walter L. Huber Civil Engineering Research Prize for his work in the area of thermal soil mechanics; his work was used in three important areas: to (1) study backfills for the Yucca Mountain, Nevada, high-level waste repository, to develop EPRI design guidance for ground-coupled heat pumps, and to design underground electric transmission lines and develop mesoscale (severe) weather forecasting models. He currently serves as a consultant to the U.S. House of Representatives and the U.S. Senate on national energy policy issues. He has worked with the U.S. Congress on environmental and energy legislation, with numerous federal agencies on geotechnical- and energy-related research, and with Fortune 500 companies on environmental cleanup.

Mr. Salomone established the industry-government partnership to develop a new earthquake source model for the CEUS and the industry-funded project to update the EPRI (2004, 2006) GMM for the CEUS. He served as the Project Manager for both national efforts, which are currently being used to evaluate the seismic safety of the existing fleet of nuclear power plants in the CEUS. He served as the U.S. Department of Energy (DOE) representative supporting the NEI/EPRI New Plant Seismic Issue Resolution Program and interacted with the U.S. NRC for its update of Regulatory Guide 1.208 and the related sections of the Standard Review Plan (NUREG-0800). Currently, he is a member of the Seismic Lessons Learned Panel that advises the DOE Nuclear Facility Safety Program, and he is the EPRI representative on the Joint Management Committee for the Next Generation Attenuation–East Project. He has provided support for the DOE Nuclear Power 2010 program and the 2006 National Electric Transmission Congestion Study. He served on the New Carolina Nuclear Power Policy Subcommittee. He is the author or co-author of over 45 published papers and many technical reports. Mr. Salomone earned his bachelor's in civil engineering from Manhattan College in Riverdale, New York, and his master's in geotechnical engineering from the University of California, Los Angeles.

F.3 TI Team

Robin K. McGuire, PhD, is the founder of Risk Engineering, Inc., of Boulder, Colorado, and is currently Senior Principal Engineer at Lettis Consultants International, Inc. He has consulted for the last 30 years in seismic hazard analysis, earthquake engineering, and the application of probabilistic methods to engineering problems. He has conducted seismic hazard analyses at sites of major engineering facilities at over 100 locations within the United States and at over 30 locations in foreign countries, in a range of technical environments. In addition, he has developed earthquake hazard software that is used worldwide in engineering, insurance, risk management, government, and research for seismic hazard estimation. Dr. McGuire is the author of over 100 papers and articles on these topics that have been published in technical journals or as technical reports, as well as *Seismic Hazard and Risk Analysis*, a monograph published by the Earthquake Engineering Research Institute (EERI) in 2004. He is a past president of the Seismological Society of America (SSA) and has served on the board of directors of both SSA

and EERI. Dr. McGuire was elected to the National Academy of Engineering in 2007. He holds degrees in structural engineering from MIT (SB and PhD) and the University of California, Berkeley (MS).

Gabriel R. Toro, PhD, is the Technical Integration (TI) Team Lead on the EPRI (2004, 2006) GMM Review Project. He is Senior Principal Engineer with Lettis Consultants International, Inc, and has more than 30 years of experience in PSHA for critical facilities and other applications of probabilistic and statistical methods to the engineering analysis of natural hazards. Dr Toro has been an active participant in nearly all large-scale probabilistic seismic-hazard analysis (PSHA) projects and methodology-development efforts since the 1980's, including the first Diablo Canyon PSHA, the EPRI-SOG study, the SSHAC study (he was a major contributor to the chapter on ground motions, as well as a contributor to the chapter on source characterization and to four appendices) and the SSHAC Implementation studies, the Yucca Mountain PSHA (SSHAC Level 4), the PEGASOS study (SSHAC Level 4), the ongoing PEGASOS Refinement Study, the recently completed Central and Eastern U.S. source-characterization study (CEUS SSC; SSHAC Level 3), and numerous seismic-hazard studies for recent ESP and COL applications to the U.S. Nuclear Regulatory Commission. In addition, he has conducted numerous seismic hazard studies for bridges, nuclear-fuel facilities, industrial facilities, and USGS-sponsored regional studies in the central United States. Dr. Toro has developed ground-motion prediction equations for several intra-plate regions, where strong-motion data are limited and simplified physical models must be used. His ground-motion prediction equations for the Central and Eastern United States have been widely used and he was a member of the expert panel in the EPRI (2004; SSHAC Level 3) ground-motion study. He is also is a member of the GMC TI Team for the PSHA for the US Department of Energy Hanford site in eastern Washington and for the co-located Columbia Generating Station nuclear power plant (SSHAC Level 3), and is a member of the SSC TI Team for the PSHA for the Palo Verde Nuclear Generating Station in Arizona (SSHAC Level 3).

Dr. Toro has made significant contributions to multiple areas of PSHA, including the development of ground motion models for regions with limited data such as the CEUS, the treatment of uncertainty in PSHA inputs, and models for temporal clustering in the New Madrid region, as well as the probabilistic modeling of soil profiles for use in site-response calculations. He has also served as reviewer for PSHA and risk studies in Asia, Africa, and the Americas. He has received numerous awards, including the Fulbright Travel Grant, the OMAE Award from ASME, and the EERI Outstanding Paper Award. Dr. Toro has a civil engineer's degree from the National University of Colombia, and master's and PhD degrees in civil engineering from MIT.

Robert R. Youngs, PhD, a Principal Engineer at AMEC Environment & Infrastructure, Inc., has more than 35 years of consulting experience, with primary emphasis in hazard and decision analysis. He has pioneered approaches for incorporating earth sciences data and their associated uncertainties into probabilistic hazard analyses. The focus of this work has been on developing quantitative evaluations of hazard by combining statistical data and expert judgment. Dr. Youngs has considerable experience in assessing earthquake hazards in central and eastern North America and implementing SSHAC processes. He was a member of the research teams that developed EPRI's seismic hazard assessment for nuclear power plants in the CEUS, as well as EPRI-sponsored research projects to assess ground motions (1993) and maximum magnitudes (1994) for the CEUS. He was also a member of the project team for the NRC project to develop response spectral shapes for analysis of nuclear facilities (NUREG/CR-6728) in 2001, and for

the EPRI project to characterize ground motions in the CEUS for analysis of nuclear facilities in 2004. Dr. Youngs has completed seismic hazard analyses of existing and proposed nuclear power plants throughout the United States (including in Alabama, Florida, Louisiana, Michigan, and North Carolina) and internationally, including in Ontario, Canada, and Switzerland (PEGASOS project). He earned his BS in civil engineering at California State Polytechnical University, Pomona (1969), and his MS and PhD in geotechnical engineering at the University of California, Berkeley (1982).

Martin C. Chapman, PhD, is a Research Associate Professor of Geophysics with the Department of Geosciences at Virginia Tech. Since 1996 he has been director of the Virginia Tech Seismological Observatory. He is the author of more than 50 peer-reviewed articles in the seismological and earthquake engineering literature. His research focuses on the geological causes of earthquakes in eastern North America, the physics of the earthquake source, strong motion seismology in general, and seismic-wave propagation in the eastern United States in particular. Dr. Chapman has over 30 years of experience as a consultant in the field of seismic hazard assessment. He serves as a technical advisor for the USGS National Seismic Hazard Mapping Project and as a working group chairman for the NGA-East project. He is currently president of the Eastern Section of the Seismological Society of America, editor of the *Eastern Section Pages of Seismological Research Letters*, and associate editor of the *Bulletin of the Seismological Society of America*. He received his BS, MS, and PhD degrees from Virginia Tech.

F.4 Technical Support

J. Carl Stepp, PhD, is Senior Technical Advisor for the EPRI (2004, 2006) GMM Update Project. Dr. Stepp has more than 40 years of experience developing PSHA methods and probabilistic seismic design bases, primarily for nuclear power generation plants and other critical facilities. During his professional career he has been a research seismologist for the U.S. Coast and Geodetic Survey (approximately 10 years); chief of the Geology, Seismology, and Geotechnical Engineering Branch at the NRC, in charge of the application of seismic hazard assessment in nuclear facilities seismic regulation (7 years); and director of the Seismic Center at EPRI, where he headed research and development of seismic hazard, seismic design, and seismic regulation technologies (10 years). He has provided consulting services in seismic hazard assessment and seismic safety regulation for approximately 20 years. At the NRC, he supervised early implementation of the nuclear seismic regulation 10 CFR, Part 100, Appendix A for reviews of 53 nuclear power plant construction and operating license applications, and the development of geology, seismology, and geotechnical engineering sections of the NRC's Standard Review Plan. At EPRI, Dr. Stepp managed a broad program of nuclear plant seismic safety research and technology development, including PSHA methods and prediction of earthquake-generated ground motion. He was technical lead for EPRI, interacting with both the NRC and industry to incorporate the integrated results of EPRI's seismic research and technology development into seismic regulations, including the 10 CFR Part 100.23 Rule Making and the development of Regulatory Guide 1.165 and Revision 3 of the related Standard Review Plan sections.

Dr. Stepp directed development of the PSHA for the Yucca Mountain high-level nuclear waste site. He chaired the development of Pre-closure Seismic Design Methodology for a Geologic

Repository at Yucca Mountain, and he chaired the Seismic Review Panel for development of the Yucca Mountain license application. He served as a member of the EPRI Technical Review and Advisory Group, supporting the NEI/EPRI New Plant Seismic Issue Resolution Program and interacting with the NRC to develop Regulatory Guide 1.208 (replacing Regulatory Guide 1.165) and to update related sections of the Standard Review Plan. He served as Chairman of the PPRP for the BC Hydro PSHA Project and as a member of the Seismic Lessons Learned Panel that advises the DOE Nuclear Facility Safety Program. Dr. Stepp holds a BS in geology from Oklahoma State University, an MS in geophysics from the University of Utah, and a PhD in geophysics from the Pennsylvania State University.

Charles S. Mueller, PhD, is Senior Technical Advisor for the EPRI (2004, 2006) GMM Review Project. Dr. Mueller is a research geophysicist with the U.S. Geological Survey and a member of the USGS National Seismic Hazard Mapping project in Golden, Colorado. Since 1995, he has been involved in all aspects of seismic hazard analysis at USGS, including earthquake catalog development, seismicity and fault modeling, implementation of ground-motion relations, PSHA and uncertainty model development and calculations, and development of related computer codes. He has led projects to develop new seismic hazard maps for Puerto Rico and the U.S. Virgin Islands (2003) and Guam and the Northern Mariana Islands (2012), and he has participated in hazard-mapping projects for the 50 states and American Samoa, as well as several international projects. Dr. Mueller has collaborated with NRC and USGS colleagues on reviews of several nuclear power plant sites. He has a BS degree in geology and mathematics from the University of Wisconsin and MS and PhD degrees in geophysics from Stanford University.

F.5 Database Manager

Serkan Bozkurt, MCP, is the Manager of Geographic Information Systems (GIS) and Information Technology (IT) at Lettis Consultants International (LCI). He has over 16 years of experience with GIS, information management (IM), and IT that support geoscience projects such as seismic hazard analysis for proposed or existing nuclear power plants, geologic and geotechnical investigations for oil facilities, offshore platforms, pipelines, bridges, dams, levees, and similar critical facilities. He is an expert in a wide range of GIS practices, including 3-D GIS analysis, scientific visualizations, animations, remote sensing technologies, digital elevation models, LiDAR, InSAR, and multibeam and radar data.

Mr. Bozkurt has managed GIS and database needs for several seismic hazard projects, including COL (Combined License) applications for nuclear power plants and SSHAC Level 2 and Level 3 studies for nuclear and hydro power plants around the world. Examples of his work include a PSHA study for the greater Tokyo region, SSHAC Level 3 Seismic Source Characterization (SSC) studies for BC Hydro dams located in British Columbia, and the SSHAC Level 3 SSC Study for CEUS nuclear facilities. He is currently managing the GIS database for the Diablo Canyon Nuclear Power Plant Seismic Hazard Update SSHAC Level 3 Project in California, in addition to the EPRI (2004, 2006) Ground-Motion Model (GMM) Review Project database. Prior to joining LCI, Mr. Bozkurt managed a GIS department at AMEC Geomatrix for 5 years, and worked with USGS Earthquake Hazards Team for 4 years as a visiting scientist, contributing to several USGS publications by utilizing GIS and information management technologies. Mr. Bozkurt has a BS in urban planning from Mimar Sinan University in Istanbul, Turkey, and an MS degree focusing on the use of GIS in disaster management and planning.

F.6 Participatory Peer Review Panel

Walter J. Arabasz, PhD, PPRP Chairman, has worked since 1974 as a seismologist at the University of Utah, where he is now Research Professor Emeritus of Geology and Geophysics. From 1985 to June 2010, he was Director of the University of Utah Seismograph Stations. He has more than 40 years of professional experience in research, project management, consulting, and occasional teaching in seismology, seismotectonics, and earthquake hazard assessment. He is the author or co-author of 46 published papers, 94 published abstracts, and many technical reports. In addition, he has served on numerous national and state advisory and policy-making committees for earthquake risk reduction and U.S. network seismology.

Since 1977, Dr. Arabasz has routinely provided professional consulting services and peer review on earthquake hazard assessments for dams, nuclear facilities, and other critical construction, including services for engineering firms, the International Atomic Energy Agency, DOE, the U.S. Bureau of Reclamation, EPRI, Los Alamos National Laboratory, and the state of Utah. He has broad experience in implementing PSHA, beginning with participation as a member of the PSHA methodology team in the original EPRI seismic hazard characterization of the CEUS (1985–1987). As a member of the National Research Council’s Panel on Seismic Hazard Evaluation (1992–1996), he observed the development of and formally reviewed recommendations for PSHA made by the Senior Seismic Hazard Analysis Committee (SSHAC). Honors include the USGS’s John Wesley Powell Award, the Western States Seismic Policy Council Lifetime Achievement Award in Earthquake Risk Reduction, and the [Utah] Governor’s Medal for Science and Technology. Dr. Arabasz earned a BS in geology at Boston College (1964), an MS in geology at the California Institute of Technology (1966), and a PhD in geology and geophysics at the California Institute of Technology (1971).

Brian S.-J. Chiou, PhD, is Senior Seismologist at the California Department of Transportation where he has worked since 2000. From 1992 to 2000, he was an engineering seismologist at Geomatrix Consultants Inc. He has more than 20 years of professional experience in applied research and consulting in strong-motion seismology and earthquake hazard assessment. He is also a member of the PPRP for the Southwest United States Ground Motion Characterization Project and the Hanford Probabilistic Seismic Hazard Analysis Project, both of which are SSHAC Level 3 studies.

Between 2002 and 2007, Dr. Chiou participated in the planning, management, and execution of the “Next Generation of Attenuation Model” (NGA) program, a major collaborative research initiative between the Pacific Earthquake Engineering Research Center, USGS, and Southern California Earthquake Center. He was a developer of the NGA model and is currently working on an update of his model in the Phase 2 of the NGA program. In addition, the last 10 years, Dr. Chiou has participated in several other research projects, including the development of single-station/single-path standard deviation of ground motions, development of predictive models of directivity and polarization effects, fault rupture hazard methodology, and a design ground motion library. Dr. Chiou earned a BS in geology from National Taiwan University (1981), an MS in geophysics from Saint Louis University (1986), and a PhD in geophysics from the University of California, Berkeley (1991).

Richard Quittmeyer, PhD, is a consultant with over 30 years of experience in the fields of seismic hazard analysis and seismology. He is currently Vice President-Seismology at Paul C. Rizzo Associates, Inc., managing and conducting hazard studies for nuclear facilities, dams, and

other critical facilities around the world. Key projects that Dr. Quittmeyer has participated in during his career include the EPRI–SOG effort in the mid-1980s to characterize seismic sources for the CEUS and the U.S. DOE’s Yucca Mountain Project. For the Yucca Mountain Project, he managed part of a SSHAC Level 4 study to probabilistically analyze ground motion and fault displacement hazards. He has also supported seismic safety review missions for the International Atomic Energy Agency. Currently, he is a member of the PPRP for a SSHAC Level 3 PSHA being carried out for a nuclear power plant site in South Africa. In addition, he has provided technical support to the U.S. Defense Nuclear Facilities Safety Board. Dr. Quittmeyer earned an AB in earth sciences from Dartmouth College (1974) and an MA (1977), MPhil (1978), and PhD (1982) in earthquake seismology from Columbia University.

Robert B. Whorton, PE, is a Consulting Engineer with South Carolina Electric & Gas Company and a licensed Professional Engineer in South Carolina. He has over 40 years of experience in seismic analysis, seismic design, seismic qualification, and seismic hazard assessment of nuclear power plant structures, systems, and components. He has provided technical leadership through EPRI and NEI in many areas, such as implementation of the seismic margin assessment methodology, the methodology for response to individual plant examination of external events (IPEEE) for seismic activity, industry guidance for seismic instrumentation and plant shutdown requirements, and development of industry guidance for response to the Fukushima Near-Term Task Force Recommendations.

Mr. Whorton was a member of the EPRI industry task group that provided NRC comments on new regulations and regulatory guides for COLs. He also participated as an industry lead in the review of the shield building seismic analysis of the Westinghouse AP1000. He is a member of the NEI Seismic Issues Task Force and the EPRI Structural Reliability & Integrity Group, which work to resolve seismic issues with operating plants and COLs. He provided the Technical Interface for South Carolina Electric & Gas Company for the seismic portion of the Summer Unit 2/3 COL, including technical presentations to the NRC ACRS and Commissioners. Mr. Whorton holds a BS in engineering (civil/structural) from the University of South Carolina.